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CONTENTS

The Truth Problem. I: RALPH BARTON PERRY 505

The Logical Significance of the Paradoxes of Zeno: DAVID F. SWENSON 515

Reviews and Abstracts of Literature:

Aliotta's The Idealistic Reaction against Science: A. C. ARMSTRONG 525

Ladd's What Should I Believe? ELLEN BLISS TALBOT 528

Dowd's The Negro Races: A. A. GOLDENWEISER 530

Journals and New Books 531

Notes and News 532

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THE JOURNAL OF PHILOSOPHY
PSYCHOLOGY AND SCIENTIFIC METHODS

THE TRUTH PROBLEM

I

THERE appear to be at least four fundamentally different senses in which the term "truth"[1] is employed. In most discussions of the topic either these four senses are blended, or some one of them is asserted to the exclusion of the others. I believe that the general problem of truth is to be solved by distinguishing these four senses and then accepting them all, each in its place. I shall call these senses logical, ontological, existential, and psychological. Truth in the first or logical sense is that 'is'-character which is represented by the verb without the sign of negation. It corresponds to the "affirmative quality" of judgments in Kant's half-psychological, half-logical account of the categories. I shall refer to it as "positivity" or logical sign. Truth in the second or ontological sense is referred to in symbolic logic by the "assertion" sign, and in ordinary language by the expression, "it is a fact that." It is the same as the category of 'being,' that which is signified by the categorical form of the verb. I shall also employ the term "factuality." Truth in the third or existential sense turns on the peculiar relation between a universal and its instance, or between a variable and its value. That which is true in this sense is said to "hold" of something. I shall also employ the term "validity," intending to imply that to be valid is always to be valid *of*. The fourth or psychological sense of truth applies only when there is an act of mind such as thought; and is then an adverbial qualification of this act. One is in this sense said to think "truly." I shall also refer to this sort of truth by the term "correctness."

Before undertaking a closer examination of these four sorts of truth, there is one principle of method that should be made explicit. It is as necessary as it is proper to assume that we can use our minds without introducing them into the discussion. Suppose, for example,

[1] So far as it is possible to do so consistently I shall employ the double quotation marks when a word is quoted; the single quotation marks when the word's meaning is intended.

that we are following the proof of the geometrical theorem that the square on the hypothenuse of a right-angle triangle is equal to the sum of the squares on the other two sides. In following such a proof we employ verbal images, we doubt, conjecture, infer, and conclude; but these states and acts of mind are not parts of the geometrical field of inquiry and do not themselves become a topic for discussion until the attention is shifted. They are no more relative to the proof than is the fact that I am using chalk or wearing glasses. It would be improper to ignore them only provided their introduction would make the geometrical equality in question more evident. Similarly when I see that this green is different from this blue, I may ignore the fact that I am seeing these colors because it contributes nothing to the evidence for their difference. It is an afterthought, a new topic, and not a constituent of the original topic. This is equally the case when the mind itself is under discussion. The fact that I am using my mind when I am studying it may be ignored, until that additional and more complicated fact of self-consciousness is expressly brought forward. The application to the matter in hand is this. If it is possible to discover truth-properties of a sort that do not contain my mind as a constituent, or depend on it as a part of their evidence, then it is proper and necessary to ignore the fact that my mind is discovering them. This new fact must be reserved as a new topic, and await its turn. *What* we are judging or thinking in any given case is one thing, which may or may not involve mind; but the fact that we are *in that case* judging or thinking is at any rate irrelevant. To introduce it is to raise a distinctly new question which must not be confused with the old. No discussion can be coherent without the adoption of this principle. It is a commonplace of science and of vulgar opinion. But philosophers, I think, can afford to be more mindful of it. Its present bearing will appear more clearly as we proceed.

1

Let us first consider the logical sense of the term "truth." This sense is inherent in the principle of contradiction, or in what Mr. Russell calls "the contradictory function." I am unable to see that in this fundamental sense the distinction between truth and falsity is other than that between positivity and negativity. Mr. Russell, at any rate, employs "not-p," "the negation of p," "the contradictory of p," and "p is false" as equivalent expressions. The symbol "$\sim p$" may be read in any one of these ways, according as linguistic convenience may dictate. The distinction is most familiar in the terms "is" and "is not," or in the fact that every language contains an

[2] *Cf.* "Principia Mathematica," Vol. I., p. 6.

adverbial negative. For everything of the sort that is referred to by the grammatical sentence, for every relational complex, there is a hypothetical negative. Thus *the* negative of the fact that France and Germany are at war is 'France and Germany are not at war'; and this fact has a determinate negative because to have such is characteristic of this type of being. In other words, it is always significant to qualify a verb by the introduction of the term "not." Let us call this type of being a propositional complex, since this expression has the advantage of ignoring the differences between propositions, propositional functions, relationships, and facts, while calling attention to their formal similarity. We may then say that every propositional complex is reversible, contradictable, or capable of being negatived, in the same sense that it must contain an act or relation, and at least one term. This is an abstract property of the propositional complex, known by inspection.

It is well, perhaps, to note that positivity and negativity are not simple opposites, or of coordinate rank. This is suggested by the fact that there is no positive adverbial particle or logical symbol. The reason, I think, is this. The original form of the propositional complex is positive. The negative form is an alteration of the positive form. p and p-positive are the same thing; whereas p-negative is something different. To say that 'S is truly P,' or 'indeed P' is mere tautology or rhetorical emphasis; whereas to say that 'S is not P' is to say something different from 'S is P.' But this alteration or reversal may be repeated indefinitely, and always with effect. 'Not,' though it may be ungrammatical, is never tautologous.

In order to express the law of contradiction it appears to be necessary to attach a meaning to "not-p is true," as when we say that 'p is false' implies 'not-p is true.' It is, therefore, necessary to admit that while a multiplication of positivity is redundant, a positive qualification of a negative is significant. If we were to say that added positivity never made a difference, then we should in the above case have 'not-p implies not-p,' simply. But the situation may be met by distinguishing between 'not (p)' and '(not-p),' where what falls outside the bracket signifies the logical sign of the whole. In that case '(not-p)' would be positive since there is no sign-symbol outside of it; its absence being taken to signify positivity. The above law of contradiction can then be expressed: 'not (p)' implies '(not-p).'

These successive reversals that are expressed by a multiplication of negatives are not new propositions about old propositions. To find that 'p is false' is not to find that 'the proposition p is a false proposition'; but it is to state a new proposition derived by the alteration of the old. Grammatically speaking it is an adverbial

change, with other parts of the sentence remaining the same; and it reflects the possibility of generating from any original propositional complex a series of propositional complexes which differ from the last only in what we may call "logical sign," that is, in that each is the contradictory of its predecessor.

This is all independent of the mental acts of affirmation and denial, or of positive and negative acts of mind generally speaking. It is independent of the act of judgment in so far as this is conceived, for example, by Windelband, as "*Beurtheilung*"; that is, as an attitude of 'for' or 'against,' of 'yes' or 'no,' of acceptance or rejection. According to Rickert, "der eigentliche logische Kern des Urteils, das Bejahen und Verneinen, ein Billigen oder Missbilligen, ein Stellungnehmen zu einem Werte ist."[3] But positivity and negativity are more fundamental than this duality of attitude in judgment. For, in the first place, it is possible to inspect the sign of propositional complexes with entire impassivity. Seeing the difference between p and not-p does not require that I shall nod my head in the one case and shake it in the other; nor does it require that I shall be cognizant of the difference between accepting and rejecting. In short, accepting and rejecting are not constituents of positivity and negativity in general, nor do they throw any light on the nature of this distinction. On the other hand, however, acceptance and rejection themselves can, I think, be understood only in terms of positivity and negativity in the more fundamental sense. Rejection, for example, is the kind of act which tends to an end-result which is negative. Thus to reject the notion of spontaneous generation is to strike an attitude such that a state of things in which the derivation of life from inorganic matter is not possible, would satisfy it, or agree with it. So, generally speaking, there is no other way to define positive attitudes of mind as a class, including such attitudes as accepting, liking, affirming, desiring, etc., except by saying that they tend to 'is,' whereas their opposites, such as rejecting, disliking, denying, aversion, etc., tend to 'is not.' It is evident that this has an important bearing on the theory of value. Without such a primitive notion as I have proposed it is impossible to distinguish between such values, for example, as aversion to life, and love of death. But using the analysis which I have proposed, we can say that the aversion is a propensity which tends to the not-being of life; whereas the love of death is a propensity which tends to the positive quality of some state of not-living.

It is no less important to see that contradiction in the logical sense is independent of physical or mental antagonism. Thus,

[3] *Cf.* Windelband's "Präludien," third edition, pages 52–53; Rickert's "Gegenstand der Erkenntnis," page 108.

although p and not-p are contradictories, so that p implies not (not-p), it is by no means the case that the assertion of p is mentally incompatible with the assertion of not-p, or mentally causes the denial of not-p. If this were the case, then it would never be possible that one should contradict one's self. It would never be possible to correct assertions and denials by appealing to the principle of contradiction.

The situation appears to be this. The assertion that 'the earth moves' is an attitude such that this positive fact would satisfy it. It is a tendency in the direction of this fact. The denial of the motion of the earth tends similarly to the negative fact, 'the earth does not move.' These two facts are instances of p and not-p. The assertion and the denial can exist together, but certain contingencies which define them are contradictories. What we require for this situation is a pair of processes of which certain later phases are instances of contradictories, whereas certain earlier phases are not. Consider, for example, the case of inhibition. The actual equilibrium in which nuero-muscular forces balance one another has nothing to do with contradiction. But we may say of two neuro-muscular processes that a phase to which one tends, or which it would reach if it were to complete itself, is related to a prospective phase of the other, as p and not-p. Similarly a collision taken as a mass of debris is not a contradiction. But we can say of a train moving east and a train moving west on the same track, that there is a hypothetical position of the first train, such as its arrival at Buffalo, which is related to a hypothetical position to the second train, such as its arrival at Detroit, as are p and not-p. These positions do not both occur, and their relation is not a relation between two facts. But the two trains exist and their courses are such as to be contradictorily determined or qualified. The contradiction itself is the formal relation of p to not-p, and enters into the situation only in so far as a hypothetical instance of it is contained in the definition of the schedules of the two trains. In other words inconsistency of mind, neuro-muscular inhibition and physical conflict are not the originals of contradiction, but have themselves to be explained in terms of contradiction in the more fundamental logical sense.

This logical sense of truth and falsity is, then, an inalienable characteristic of a certain type of being. There is no such thing, in other words, as a propositional complex without sign. Formal logic devotes itself to the study of this and kindred properties, such as disjunction, conjunction, the variable, implication, etc. But even logical knowledge embraces more than the bare apprehension of these properties. It discovers certain specific propositions about the proportional complex as such. These latter are the theorems or laws

of logic. But these have to do with truth in the ontological or categorical sense, to which we must now turn.

2

Let us first illustrate our second sense of truth from the formal realm of logic. Thus we may simply call attention to the contradictory function, that is, to the peculiar difference between p and not-p; or to a categorical fact of contradiction, such as 'p implies not (not-p).' This distinction is illustrated, for example, by the difference between 'p implies q' and '(p or q) implies p.' The latter appears in formal logic with the so-called "assertion" sign prefixed to it; the former is said to be merely "considered." I believe that it is possible to rid this distinction altogether of the psychological associations that cling to the terms "assert" and "consider." When one considers p, one does not have a proposition before the mind, but propositionality. Similarly, for 'p implies q,' one does not have before the mind the propositional fact that p implies q, but the general character of implication with the duality of terms which that involves. It is not a propositional complex because it lacks terms. That is to say, p does not stand for anything except the term-character, or term-reference, which is a part of the implicative as of other relations.[4] When, on the other hand, one asserts that (p or q) implies p, one has terms as well as the implicative relation, 'p or q' being the nature of the positive disjunctive relation, and q having the specific character of being the same on both sides of the relation. There is no relational complex unless there is something which is in the relation in question. If there is, then the assertion sign may be attached to the symbolic propositional expression. In other words, it is a question as to what is before the mind, and not of the attitude of mind itself.

It may be argued that this does not meet the difficulty that the same proposition may be considered and asserted, and that this possibility is essential to logic. Thus, the proposition 'p implies p' which is asserted in logic, may appear as a constituent of the proposition '(p implies p) implies (p implies p),' where it is not asserted. It is to be noted, however, that no such proposition as this appears among the propositions of logic, because it merely exemplifies the law 'p implies p.' It is equivalent to asserting that there is a proposition, namely, 'p implies p,' of which the law that a proposition implies itself holds. Logic does not discover instances of laws, but only

[4] p does not mean 'other than q,' nor do p and q both mean mere propositionality. The first interpretation would give an erroneous proposition (in the sense considered below). The second interpretation would mean that every proposition implies itself, and should be expressed, 'p implies p.'

laws which are whether there is anything that obeys them or not. To say that in '(p implies p) implies (p implies p),' 'p implies p' is not asserted, means simply that it is not found. It is not there, so far as logical discovery is concerned. It is there only in so far as it is discovered in some extra-logical manner that there is a proposition which affords a case of the logical law.

This non-asserted factor in propositions is more familiarly known in cases of physical or mental particulars, and its non-assertion is more commonly expressed in the hypothetical form of speech. Thus, we say, "if the earth is a sphere, then all points on its surface are equidistant from its center." This every one would grant to be a fact, even though he denied that the earth *is* a sphere. If the total fact is independent of the earth's being a sphere, then the earth's being a sphere can not, *as a constituent of it,* be itself a fact. And if we are careful we shall say, I think, that what we really see is not anything about the earth, but what is implied in sphericity. Instead of "the earth" we might better say "the earth, for example," or "anything." So the non-asserted proposition 'the earth is spherical' simply isn't there, except in a verbal or symbolical sense yet to be accounted for. Even so something else can be substituted for it without altering the fact which is known.

Similarly, it is a fact that you are reading this. 'Your reading this' is a complex of the propositional sort, and it possesses the ontological or categorical status. This is different from its positivity which is opposed to the negative character of 'your *not* reading this.' Its factuality is opposed to the character attaching to 'you' as a constituent of the complex, or to 'your reading this' as a constituent of the complex 'your reading this implies your not ignoring this.' 'You' are not a fact because 'you' are not a propositional complex. In '(your reading this) implies (your not ignoring this),' 'your reading this' is not a fact because in the total fact, this constituent has no terms. The total fact, as one sees that it is so, is independent of 'you' and of 'this.' It is equivalent to 'p implies not (not-p).' The total fact does have terms, namely, 'positive proposition' and 'double negative of the same proposition.' The fact 'you are reading this,' although a fact, is not a logical fact, because it contains the terms 'you' and 'this,' which are not among those general structural properties of propositional complexes which distinguish the terms of logic. Thus a fact is a propositional complex with terms. It is found as such, and not created by the act of knowing. A non-fact is anything that is not a propositional complex; or a propositional complex without terms. It commonly appears as a constituent of a fact. A logical fact is a fact in which the terms are propositional complexes without terms. It is a fact about the propo-

sitional complex as such, in which the terms are variables; or a fact in which what is given is the nature of one or more universals and their relations.

To sum up, then, we may say that in logic certain abstract data, such as the characteristics of the propositional complex, are brought to light. Among these properties are positivity and negativity. Logic also brings to light certain propositional complexes in which these properties are the terms. These propositional complexes may not improperly be called "logical facts." They are true both in the sense of having the character of positivity, and in the further sense of having the categorical or ontological character. They possess truth of both sorts quite independently of any knowing mind. It is impossible to characterize a knowing mind or any other similarly complex existent without appeal to these varieties of truth as more primitive. It is true that these facts are arranged in logic in an order of "inference," or "proof." This, I believe, means two things. In the first place it means simply that some of the facts are implied jointly by others. But these trains of reasoning are not themselves among the purely logical facts or theorems. They are introduced because, in the second place, logical facts, if they are to be apprehended at all, have to be apprehended in a certain order. There is a necessary order of evidence or exposition, for which the only objective basis is this order of joint implication. A logical treatise aims to get logical facts apprehended. It will therefore place first what it is necessary to have seen in order to see what is placed after. In saying that logical facts are "about" propositional complexes without terms, or propositional functions, we have already employed the third sense of truth, to which we now turn.

3

We have now to do with the situation in which there is a propositional complex with variables on the one hand, and something that is a value of a variable, on the other hand. It is what we have when a law holds or is valid of something, or an event fits a description, or a thing enters into a relation. It is fortunately not necessary to adopt any consistent nomenclature, or reach any precise account of the distinction. It is perhaps nothing more than the distinction between a universal and one of its instances. All that we do need to assume is that this is an objective distinction, holding of our world regardless of whether that world be mind or matter. There is, so far as I can see, no possibility of doing away with universals. The effort to do so has never, as Mr. Russell has shown, accomplished more than the reduction of other universals to similarity, and such a reduction disposes of no difficulties.

Let us consider an example: '*x* to the right of *y*' prescribes what shall be the case with any value of *x* or *y*. If there is a thing (such as this hand with which I write, *w*), which is a value of *x*, and another thing (such as this hand with which I hold the paper, *h*), which is a value of *y*, then 'to the right of *h*' describes the one and '*w* to the right of it' describes the other. There are two things which obey the law '*x* to the right of *y*.'

There are two aspects in which "truth" appears in this situation. First, I say of the law that it is "true *of*" my right hand; or that it is true of existence generally in the sense that there is a value for the variable. Second, I say of the value that it "satisfies" the law, or is "true *to*" it. The former is the sense in which the laws of Euclidean space are said to be true of nature. The second is the sense in which Lincoln is said to be a true man, or the orbit of the earth a true ellipse. They are true to some general function or law. It is in this latter sense that the term "true" is sometimes used interchangeably with the term "real." A "real" difference is simply an instance which satisfies the relation of difference. This sort of truth may be termed "existential," if we use this term to signify 'instance' or 'case of,' as when we ask "breathes there a man with soul so dead," etc.?

It does not appear, however, that there is any corresponding sense of falsity. The law which does not hold of an event of nature is not 'false of' that event, because it is not in any discoverable sense 'of' it at all. Triangularity is not false of Shelley's "Ode to a Skylark"; it is simply irrelevant. Similarly, the event of nature that does not satisfy an equation, is not 'false to' that equation, it is not 'to' it at all. Even if there be a law which nothing obeys, it is not false of existence. It simply does not relate to existence. One can, if one wishes, say that a law is false of everything that it doesn't apply to; and that a particular is false to every law that it doesn't conform to. But even so, this does not provide for the cases in which a law is said to break down in a particular application, or an event to violate a specific law. We may say of an event which obeys a law which is the contradictory of *M*, that it disobeys *M*. But why in that case is it held to violate *M*, rather than any of the other laws with which its law is equally contradictory? Here it seems necessary to introduce a mind which relates a law to an event, by thinking the one of the other. In this way, through the intervention of mind, a law may be misapplied to an event, or an event defeat an expectation which has been created of it.

We must be careful not to assume that all of the general functions that may apply to nature are themselves logical facts. For the majority of them are not. The laws of physics do not, like

the theorems of logic and mathematics, stand in their own right. There would, for example, be no law of gravitation unless nature obeyed it, whereas the laws of analytical geometry hold regardless of nature. The law that the velocity of a body falling to the earth increases proportionally to the time, is logically and mathematically no better than the law that it increases proportionally to the distance. Neither is true inherently, in the categorical sense of the term truth. The first law is true *only* in the sense that it is true of actual bodies in nature. The same is the case with the Ptolemaic and Copernican astronomies. The Copernican astronomy is true existentially or materially, but not formally; the Ptolemaic astronomy not at all.

But what, then, is the Ptolemaic astronomy, or Aristotle's law that heavy bodies fall faster than light? They are hypotheses, doubtless. But what, then, is an hypothesis? It contains two characteristics. In the first place, it is important to note that it has logical structure. It could not be framed at all unless there were certain fundamental truths of the sort already considered. A "genuine" hypothesis is one that is logical or mathematical. It is not a mere combination of symbols. It must exemplify such properties as contradiction, implication, disjunction, etc., and such abstract propositional facts as are contained among the theorems of logic and mathematics. In the second place, it is important to note that it is *framed;* which means that over and above these more fundamental facts which the mind finds, there is a special application or assignment of them which the mind creates and may or may not find. To take a relatively simple case, let us consider the hypothesis that the population of New York is greater than that of London. This is a genuine hypothesis in the sense that there is such a relation as 'greater than'; that is, 'x is greater than y' refers to a mathematical property. The hypothesis, which contains this relation or function is, as we say, 'intelligible,' in that it means something that one thing should be greater than another; one is saying something when one uses these words. There is also New York, and there is London. But 'New York as a value of x,' and 'London as a value of y,' is due to the intervention of mind, at least so far as the hypothesis is concerned. The hypothetical act is this assignment of a given particular to a variable of a given function. The propositional complex 'New York is greater than London' is true of the hypothecating mind, as something which it does; whether or not 'greater than London' is true of New York, that is, independently of mind.

Let us suppose this last alternative to be the case. We then have a law 'x is greater than London' which is true of something, namely, New York, in the third or existential sense of the term truth. But

this law is itself a fact, if we construe it to mean that the principle of having something greater than itself is true of London. Thus a fact may be true of a fact. But the law, 'x is greater than y,' while true of London, is not itself a fact. This, then, is true only in the third or existential sense. Now if it so happened that London was greater than New York, then the complex "New York is greater than London" would be annihilated altogether, unless some mind entertained it as a hypothesis. In that case it would be true only of the mind entertaining it. It would then be a *mere* hypothesis. But according to our supposition that New York is greater than London, 'x is greater than London' has a triple status; it is a fact, it is true of New York, and it is a hypothesis. When such is the case we have, I believe, the fourth type of truth, to which we shall presently proceed.

Before doing so, however, it may be worth while to indicate the sense in which nature is irrational, or non-logical. A fact which is true existentially may be a logical fact. Thus '(x is greater than y) implies (y is less than x),' while it is true of New York and London, is also itself a fact. There is such a propositional complex, quite apart from its application to these historical cities. It is doubly true; it is true existentially, as the law of something, and it is also a mathematical fact holding of the property of magnitude. A realm of existence which exemplified only logical or mathematical facts, so that all of its laws were categorically true independently of everything but the bare structural or formal properties of the propositional complex might be termed a purely rational world. It would simply illustrate pure logic and pure mathematics. As a matter of fact, however, the physical or natural laws, although they contain such formal truths, are not as they stand formally true. For, as we have seen, such a law as Galileo's law of acceleration, to the effect that the velocity of a falling body is equal to the time of its fall multiplied by a constant, is true *only* in the sense that actual falling bodies obey it.

RALPH BARTON PERRY.

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(*To be continued*)

THE LOGICAL SIGNIFICANCE OF THE PARADOXES OF ZENO

THAT the paradoxes of Zeno still maintain their interest for the student of logic is a significant fact which has been recently emphasized by the discussion of these problems in Mr. Bertrand Russell's volume, "Our Knowledge of the External World." In this work the conviction is expressed that these ancient difficulties

have now received a final solution through the formulation of a positive theory of the infinite, and this is cited as affording a brilliant illustration of the triumphs which we may expect to achieve in philosophy when the method of logical analysis comes into its own. Russell's solution turns upon the definition of a mathematical continuum as applied to space and time; the question of the nature of space and time is placed in the foreground, and the solution assumes an actual infinite. It seems to the writer, however, that the paradoxes may be regarded from a different point of view, and that, by so shifting the standpoint, the above problems are seen to be merely subsidiary and incidental. Without attempting to deny that the nature of space and time is in some sense involved (in the argument of the stadium this is the proximate, though not the ultimate, issue), it may be doubted whether any view which puts this issue in the foreground poses the problem in its most fundamental form. It seems to me at least, that an even more universal and significant issue is raised by Zeno's arguments; and that unless this is clearly grasped, the bringing in of the problem of the infinite tends rather to confuse than to clear the logical situation.

The central problem of the paradoxes is nothing less than the problem of the nature and limits of logical explanation, and consequently, of the relation between reality and logic. Russell asserts the principle that logic is confined to the formulation and invention of possibilities, as distinct from a determination and limitation of the actual.[1] But this is only one aspect of the matter, and concerns the validity of Zeno's arguments only indirectly. Russell also affirms that the analysis of change and continuity is a problem whose solution is a necessary pre-condition for understanding the world, and that this is preeminently a task for logic.[2] If this is true, it becomes important to apprehend clearly the nature and significance of logical explanation. For unless we do this, we may find ourselves confronted with an insoluble problem, on account of having raised an illegitimate question; we may be lured into the pursuit of an ancient will-o'-the-wisp under a modern guise. It is in their relation to this question that Zeno's arguments prove their enduring vitality; for they furnish a crucial test of the limits of logical explanation. It was no doubt Zeno's purpose to prove the unreality of space and time and motion, and of the pluralistic universe generally. It must be confessed that his arguments are not sophistical, nor capable of an easy and superficial solution. Nevertheless, they are capable of another interpretation than that which he himself put upon them; instead of implying the unreality of change, they may be

[1] "Our Knowledge of the External World," p. 58.

[2] *Op. cit.*, p. 16.

regarded as demonstrating the impotence of logic to construe the reality of change. This, at least, is the standpoint from which I wish to discuss them.

The argument of the race-course seeks to prove the impossibility of reaching the end of the course; it rests the proof upon the admitted necessity of first traversing the half of any remaining distance, a necessity which is never obviated. Let us expound Zeno somewhat freely, but without losing sight of the main point. "For the sake of the argument," we can imagine him saying, "I am willing to admit that the runner is able to traverse half the distance between himself and the goal; and having done this once, I will admit that he can do it again, and so on repeatedly, as long as he likes. But you on your part must also admit that he can not reach the goal until he has first made an end of traversing the successive half-distances which I have thus conceded to him; and this, you will readily see, is impossible. For there will always be another half-distance to traverse, however far along the runner may have advanced in the course of this serial progress."

What is now the root of the difficulty? It evidently consists in this, that from Zeno's concession to the requirements of the runner who wishes to reach his goal, there is no logical transition; physically, the difference may become as small as you please, but logically, the gulf is a yawning chasm. Zeno conceives and defines the runner's advance wholly within the qualitative determination: "some half distance this side of the goal"; from this there is no logical transition to the qualitatively different determination: "at the goal." The transition is a logical "leap," for it is what Aristotle calls a μεταβάσις εἰς ἄλλο γένος. The puzzling character of the argument is due to the fact that Zeno's initial concession constitutes a quantitative approximation to the goal, which is alluring to the imagination, since the runner is constantly getting nearer and nearer, until the intervening distance seems so small that it may be neglected; but the self-constraining immanence of the initial logical assumption is then brought to bear, and we are sharply reminded that the runner's progress is defined only within the sphere of the "not-yet-there." The beauty of the argument lies in the triumphant victory of the thought over the seductions of the imagination and the blandishments of the quantitative approximation. The thought insists on respecting the boundary line between one quality and another; in spite of the fact that the confusion and weariness of mind caused by the never-ending process of diminishing the intervening distance, seeks relief in letting it be finally wiped out, the thought holds this tendency in check and immutably insists on the basic fact that Zeno has conceded its diminution by one half only.

Russell replies to this argument by pointing to the fact that there really exists something beyond an infinite series. We might just as well have replied to Parmenides's argument for the One, by pointing to the general assumption that more than one reality exists; or invited Zeno to go down to the race-course to see for himself how the runner reaches the end of the course. For the point on which Zeno is insisting is that the limit which such a series approximates is *beyond* the series, not immanent in the series, and therefore not logically implicit in it, but reached only by a leap. And it is this leap which Zeno passionately refuses to take, because for him logic is the sole standard of reality, and a reality which can not be logically construed is a mere appearance. Let us note precisely *why* the completion of the series defined in Zeno's argument is declared to be impossible. It is certainly not on the ground of empirical evidence drawn from the observation of runners. Nor is it on the ground of the fact that counting the steps of such a series one by one, or the imaginative traversal of these steps, is empirically found impossible of completion within a finite time. In the nature of the case such negative empirical evidence is unattainable. The ground is absolutely and purely logical, and does not primarily involve any reference to time at all. The ground is contained in the logical principle that a series so defined as to be endless and therefore as having no last step, can not without a manifest self-contradiction be regarded as ended, so that the last step is reached. This logical impossibility may be viewed secondarily under the form of time; it then translates itself into the proposition that the series can not be completed in a finite time. But this is because the series is in itself incomplete, and incomplete *by definition.* Zeno defines the runner's progress, so far as he is willing to concede it, in terms of a series which has the attainment of the goal outside itself; although this goal is the limit which the series endlessly approaches, the limit remains forever external to the process of approximation.

Zeno's initial assumption may indeed be regarded as sophistical, for it is no more difficult for a runner to traverse the whole than the half of an intervening distance; every actual whole is from another point of view a half. But it must be remembered that the argument is *ex concessis;* in any case, its significance does not depend on the propriety or the impropriety of the initial assumption, but in bringing to consciousness the principle that we can not construe the whole out of the half. The concession of the half proves to be illusory, since it leads to an endless approximation, and the argument very properly insists that half of the intervening distance is not the whole, no matter how small this whole may be.[3]

[3] The argument has here been discussed from the point of view of a pro-

The essence of the argument of the race-course, and of the remaining arguments as well, can therefore be stated without any reference to the infinite. The reference to the infinite is collateral; in the first and second arguments it is introduced as the result of an apparent concession yielded by Zeno in favor of the possibility of motion. The concession turns out to be illusory, because it merely defines an operation of approximation of such a nature as always to remain within the sphere of the "not-yet-there"; the conclusion of the argument brings this to consciousness, and motion is seen to be possible only on condition that it shall never arrive anywhere. The second argument, of Achilles and the tortoise, is essentially identical with the argument of the race-course, except that the concession is here introduced in another form. Instead of the process of halving the intervening distance, we have here offered us as a concession, the process of reaching the point which the continually moving tortoise has just left. As long as the tortoise moves at all, at however slow a rate, this process is capable of repetition; and however often repeated, it does not pass over into the logically transcendent process of catching up with the tortoise.

The reflective process, specific illustrations of which are thus experimentally introduced into Zeno's two first arguments, is inherently infinite. It contains no immanent principle which logically necessitates or provides for its own cessation; it contains no immanent principle which logically necessitates or provides for a transition to a qualitatively different determination, Hegel and his dialectic method to the contrary notwithstanding. Here we have a fundamental logical truth, applying to every reflective process, however defined. This principle appears in the reflective process of subdivision as applied to spaces, times, or intensive magnitudes; it applies to the process of positing an anterior cause for an event, and the process of positing a posterior effect for a cause; it appears in the process of representing a spatial beyond, and a temporal before or after; it is the process in accordance with which the infinite series of finite numbers is produced by means of the repeated addition of *one;* it is the magic by which the mathematicians produce an infinity of ideas out of one object of thought, by means of the repeated positing of an idea of the already posited idea; it applies to the relation between a universal and its embodiment in particulars; it is therefore

gressive series, but essentially the same considerations apply if we interpret the argument as positing a regressive series, by which the runner is prevented from making a start. If, before traversing the whole of any initial distance, it is necessary that he should have first traversed the half, then, since every half is for the next reflection apprehended as a whole, he will not be able to traverse any initial distance, however small; for the argument concedes only the half of such a distance.

the secret of the inductive leap, and of the approximative character of the natural sciences, and of all the historical disciplines; it applies to the analysis of a given totality into its aspects or qualities; in short, it applies to all reflective processes however defined. The principle involved is, that if a thing can be done once, it can be done again; for the sphere of the logically possible is quite incommensurable with the sphere of the actually possible, and is not subject to the influence of the quantitative. But this absolute quantitative freedom of the reflective process is matched by an equally absolute qualitative restriction; for it can not transcend the logical immanence by which it is initially defined. The self-representative map-system which begins with England does not finally transform itself into a map of the United States, or enlarge itself to cover the universe in its scope; and the approximation-process which is defined as remaining within the sphere of the "not-yet-there" does not finally leap over into the "there." Not because there is insufficient time; this is an imperfect expression for the self-restraint of the logical immanence, and has deceived many a thinker into accepting a solution of Zeno's paradoxes based on the infinite divisibility of time, whereby any infinite process becomes commensurable with any finite time. But such a solution is in danger of missing the point entirely; it solves the problem, not by solving it, but by matching it with a parallel problem which it does not solve. The insufficiency of the time is an inadequate and misleading expression for the logical impossibility of the transition to a new quality. It is misleading, because it tends to substitute the concept of actual impossibility for the concept of logical impossibility; the supposition that a new quality could finally emerge as the immanent outcome of the reflective process is a logical absurdity, and an immanent transcendence is a contradiction in terms.[4]

But does not the positive theory of the infinite here come to our aid, and does it not throw an entirely new light upon the problem of the paradoxes? By no means; the positive theory of the infinite does not alter the logical situation here exposed in the slightest degree; if anything, it sets it into stronger relief. The advantage claimed

[4] There is a childish game which mimics the attempt of the understanding to bridge the chasm between one kind and another by means of a quantitative approximation. It begins by counting: one I see, two I see, and so on, until it reaches ten, when it triumphantly brings out, Ten-nes-see, the name of a state! produced quite naturaly by the process of counting. It is the very same trick or illusion which is the secret of the supposed explanatory power of the theory of evolution. Because we can discover quantitative approximations, the emergence of a new quality seems somehow less abrupt and miraculous; after a while it becomes almost self-evident, and finally the new quality seems a logical and necessary outcome of the preceding state. Cf. Kierkegaard, "Begrebet Angest," p. 32, where there is a similar remark.

for the newer formulation is twofold. In the first place, it defines the concept of the infinite all at once, by a single logical act, determining the class by the defining property of its members. This is both correct and necessary, for it is the condition that we should have any definition at all. But why is it an advantage as over against the negative theory? The negative theory has precisely the same merit. A definition of the infinite as endless determines the whole endless series or collection all at once, by means of a single *negative* defining property, in precisely the same way that a definition of it as self-representative, for example, determines it all at once, by means of a single *positive* defining property.[5] The reason why the positive theory seems to be an advance in this respect is that a confusion arises between the endlessness or incompleteness of the series, with the endlessness or incompleteness of the definition of the series. The same confusion arises in connection with the static character of the concept. It is assumed that a static concept can only define states, but not processes. But this is not so. Time as pure duration, as an endless passing by, as a constant vanishing of states which *as states* are therefore non-existent, is just as much a conception of the intellect as is the conception of an instant or of a permanent state. This first advantage, then, is illusory, and is simply a circumlocution for the logical nature of all conception, positive and negative alike. The second advantage of the positive theory is that it starts from a totality posited by definition, which is by definition (directly or by implication) resolvable into an infinity of members. And this is no doubt correct and permissible; perhaps this method of approach is the key to a revolutionary advance in mathematical research, on which question I do not pretend to offer a judgment. But before I can bring myself to admit that it also revolutionizes logic and philosophy, I must ask to have one little question answered; *how* does the positive theory posit the infinite totality with which it starts? Does it construe it out of its single elements, or does it posit it by taking a new point of departure? Happily, the answer it not hard to find, for the positive theory itself not only does not conceal, but openly professes, that no infinite totality is ever reached by a summing up of elements,

[5] Russell seeks to show by examples that infinite series are not necessarily endless, but that they may have one or even two ends. This involves a confusion as to just what it is that is in each case endless; a finite line has two ends, but the process of determining points on the line, or the process of subdividing the line (the synthesis and the analysis) is nevertheless endless. We have here a confusion of the logical problem of completing an endless process with the problem of the physical existence, and hence the finitude, *from a different point of view*, of totalities whose analysis gives rise to the endless process; in other words, it is answering Zeno by appealing to the fact that the runner can be observed actually reaching his goal. Cf. "Our Knowledge of the External World," p. 179.

but only by shifting to an absolutely new point of view. The leap which in the negative theory is outside the definition is in the positive theory included in the definition—*but it is precisely the same leap.* The positing of infinite totalities which from another point of view are finite, is an old achievement of thought; such totalities we have always with us. If there is anything remarkable or revolutionary connected with the whole matter (which is what one would be led to suppose from the romantic glamor with which the invention of the positive formulation has been invested), it would have to consist in the abolition of the *leap;* in the overcoming, by the technique of mathematics, of the qualitative immanence of logical thought. This would indeed be a remarkable achievement; Hegel staked his reputation as a thinker on the claim of having accomplished it by means of the dialectic method, but history has not judged him leniently in this respect. Take any infinite totality, a line, a duration, or the series of finite numbers; if the reflective process is applied to such a totality by way of analysis, the analysis never becomes complete, never reaches the last elements, without making a leap; if the reflective process is applied to the elements by way of synthesis, it does not reach the totality (or the continuity) except by making the same leap in the reverse direction. The endless subdivision of spaces yields spaces, but not points; the endless multiplication of points yields points, but not a geometrical continuum. The analysis or the synthesis becomes *complete* by a breach of logical continuity; points and instants are not homogeneous with spaces and times, and the one concept is not derivable from the other by a mere quantitative determination.

The positive and negative theories of the infinite thus supplement one another. They express the obverse and converse sides of the same logical situation. The positive theory leaves the inherent negativity of the infinite absolutely undisturbed (in the compact point-series there is no next point; the subdivision of spaces and times gives us no smallest element, and hence no points or instants; a transfinite number can not be reached by counting, etc.). The negative theory, properly understood, does not deny the existence of positive totalities which are infinitely resolvable into elements. Both theories unite in asserting that such totalities are, from the standpoint of the elements, reached by assuming a new point of departure; and that the elements are, from the standpoints of the totalities, reached in precisely the same way.

We need only touch briefly on the third and fourth arguments, since the fundamental principle has already been amply discussed. The arrow is at rest in every position which it occupies (or in every instant); how then can it be said to move? We may reply, if we

wish, that the initial proposition constitutes an irrelevant tautology; for it is not surprising that the arrow should be at rest *in every position,* position being a determination of rest. (In the same way we may reply that motion takes time, and the instant not being a determination of time, it is a tautology to say that there is no motion *in the instant,* or even in all the instants taken collectively.) Or we may reply, if we prefer, that rest is a concept which requires more than a single instant for its determination, *and also more than a mere collection of instants,* since rest consists in occupying the same position for all the instants included *in a certain period of time.* But these answers lose all their force if there is nothing in time but instants, and nothing in motion but positions. For out of the positions which the arrow occupies, you can not construe the transition from one position to another; and out of the instants which the arrow occupies in its flight, you can not construe the duration in which alone the motion can take place. Both positions and transitions, both instants and times, are required for any adequate determination of motion; Zeno assumes only one of the two mutually supplementary concepts, makes an unsuccessful effort to construe the other, and interprets his failure as evidence of the unreality of motion.[6]

The argument of the stadium is somewhat complex in statement, and I shall not attempt to elucidate it in detail. Here again the difficulty arises from supposing time and space to be constituted by instants and points, and from the attempt to define motion and its

[6] In this note I will refer the reader to a couple of passages in Mr. Russell's book, which seem to indicate that at certain crucial points he is unaccountably blind to the issues involved. The first is on page 151, and asserts the necessity of analyzing change completely, by reference to terms which are not changes. We have already shown that this involves a leap out of the immanence of the change-concept. This shifting to a new point of view is not a necessary consequence of reflecting upon changes, but is reached as the result of an arbitrary interruption of this reflective process, by virtue of an act of the will. The second passage is on page 138, and asserts that if the mathematical theory is adequate, nothing happens when a body moves except that it is in different places at different times. The phrase "in different places at different times" conceals the possibility of an ambiguity. If it includes in its meaning the transition from one place to another the proposition is trivial, and says nothing that needs any support from mathematical theory; to be exact, the verb "comes to be" should be substituted for the verb "is." But if not, the proposition is self-contradictory; the idea of a process, as indicated by the word "happens," is equated with the idea of a state, as indicated by the word "is." The proposition is refuted by the basic principle of the Eleatic dialectic: *You can not construe becoming from being.* Either Mr. Russell has overlooked this dialectical boundary, as impassable for logic as the widest chasm; or else he has not overlooked it, but seeks to make the leap in the strength of mathematical theory. In the latter case, his proposal is a recrudescence of the Hegelian dialectic in a mathematical form.

velocity exclusively in terms of instants and points. This is equally impossible whether we assume a finite number of points or instants in a given space or time (an assumption which is certainly false), or an infinite number of such points and instants (an assumption which is undoubtedly correct). For the points or instants do not yield space or time except in conjunction with the idea of a serial order, a before and after, a between; but this idea is simply the notion of a geometrical or temporal continuum in a surreptitious form. The assertion that there is no next point (instant) is merely an expression for the fact that space (time) is not constituted by points (instants); by which we do not mean to deny that it contains them, nor that positions and motions are determinable only by means of a reference to such entities.

The lesson of the paradoxes is thus not a mere clarification of our ideas of space and time; they do not pose an esoteric and highly technical problem, soluble by the progressive refinement of our logical and mathematical methods. They teach that the fundamental principle of all logical explanation is the principle of immanence; or in other words, of ground and consequence. Logic is therefore compelled to confess its impotence when confronted with the problem of explaining change. This does not mean that change is mere appearance; such an assertion is a perversion of the voice of logic, which philosophers have allowed themselves through misunderstanding its scope and function. Every change and every transcendence is a breach of logical continuity, and hence from the point of view of logic, a paradox. The far-reaching consequences of this principle I can not here undertake to suggest; but the history of philosophy and of science is full of attempts to dash the head of the intellect against this impenetrable wall.

In conclusion, let me try to express this principle in a slightly different form. Professor Royce and Mr. Bradley have each formulated a logical principle having a bearing upon the problem we have here discussed. Although Royce seems to regard the two formulations as in some sense antagonistic, it is possible to combine them in a single formula, and this formula will then sum up the argument of the present paper. Bradley says: *Thought can not make differences.* Royce replies: *Thought begets, as the self-evident outcome of its own unitary reflective purpose, an endless process.*[7] I assume, and the preceding argument must be the warrant for my assumption, that these two theses must be combined; they constitute, in fact, the obverse and the converse side of the same principle. I also assume that the additional considerations which Bradley and Royce, re-

[7] Cf. Royce, "The World and the Individual," I., p. 473, where Bradley is quoted.

spectively, regard as expansions or implications of their respective principles, must either be rejected or re-interpreted. When Bradley, for example, adds that Thought can not receive differences from the outside, and ready-made, he evidently places himself at the viewpoint of Zeno. In so far as he intends to assert that immanence is a *sine qua non* of every form of logical apprehension, our argument has sought to establish the same position; but in so far as he identifies Thought in general with logical apprehenison, he ignores the function of Belief as a supplementary mode of thought. For Belief is the form in which we apprehend the transcendent. On the other hand, when Royce seeks to interpret the endlessness of the reflective process as typical of the way in which a monistic principle logically unfolds itself in an infinite multiplicity of forms (thus substituting logical emanation or development for the idea of creation as an explanation of the world of space and time), it will be necessary to urge that the endlessness of the reflective process is always a repetition of the same; that it never passes over into a new quality; that its apparent "movement" is precisely analogous to the uniform velocity with which a moving body continues to move when free from the influence of every external force; that this endlessness, like the uniform motion of the moving body, is inherently static (not involving any change) and purely ideal, and thus affords by itself no description or type of any actual happening in any actual world; and, finally, we must urge that the arguments of Zeno, who was also a monist, constitute the historically valid objection against every attempt to establish a logical bridge between the One and the Many. On the basis of this understanding I propose, as a summary of the argument contained in the preceding pages, the following unification of the two principles quoted above: *The endless quantitative approximation toward a new quality which is implicit in the process of reflection remains always within the quality initially posited, thus testifying to the impossibility of a necessary logical transition from one quality to another.*[8]

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REVIEWS AND ABSTRACTS OF LITERATURE

The Idealistic Reaction against Science. A. ALIOTTA. Translated by Agnes McCaskill. London: Macmillan and Company. 1914. Pp. xxii + 483.

This work is a revision of the author's "La Reazione idealistica contro la scienza," 1912, made for presentation in English dress. Besides the

[8] I owe the underlying idea of this paper to a study of Kierkegaard, whose logical position I have sketched in a paper published in a recent number of the *Philosophical Review.*

labor of correction and improvement Professor Aliotta has undertaken a certain rearrangement of his material. The constructive portions, formerly scattered through the book, he has now collected into a concluding chapter which gives the outlines of his spiritualistic realism. The earlier —by far the more extended—parts are devoted to an historico-critical discussion of his immediate theme. The translation runs easily and fluently, in spite of the inordinate length of the paragraphs—the longest, one might conjecture, since the "Kritik der reinen Vernunft." And in so far as can be gathered without the original at hand, the rendering is accurate. Here and there the reader queries whether certain small ambiguities existed in the original text. But in a much greater proportion of instances it is evident from comparison with the sources of the doctrines described that the work of translation has been successfully accomplished.

These few ambiguities may also proceed from another cause. Part I., "The Reaction from Intellectualism in the New Theories of Knowledge," ranges from Spencer to Royce and Münsterberg, considering neo-criticism, empirico-criticism, neo-Hegelianism, Bergson and his school, and pragmatism on the way. Part II., "The New Theories of Mathematics and Physics," covers the non-Euclidean geometry, logic and mathematics, energetics, and the like. The method of presenting these wide-ranging theories is the historico-critical. The doctrines considered are stated by interpretative narration. The critical remarks are appended in separate sections, or suggested in connection with the principal theses. Now and then the reader must be careful to note just where history stops and criticism begins, or even to distinguish the primary doctrine from its narrative reproduction. But these blemishes are few and of minor importance. In the main, the author puts the reader in his debt by his extended and accurate review of recent thinking in so far as this bears upon his central theme. There are few books which can be so heartily recommended as summaries of recent epistemology, alike in its philosophical and in its scientific forms. The trained student will here find reminders of much of his own reading, and in addition suggestive reports of work that perhaps has escaped his direct study.

The title of Professor Aliotta's treatise, however, hardly describes its content. It would be more precise to term it The Reaction against Intellectualism, and its Culmination in Recent Scientific Methodology. Intellectualism the author takes in the widest sense of the word as "those epistemological systems which assign an autonomous value to the cognitive function"; and he counts as "forms of reaction all those which . . . make the value of science and knowledge in general depend upon . . . other functions of the mind and rank will and imagination above intellect" (p. xxii). Hence he is led to discuss both the conflict between intellectualism and voluntarism or emotionalism and the conflict between rationalism and empiricism, intuitionism, etc. So the currents of his thinking cross and re-cross. But there can be no doubt of the point at which his most successful work is achieved. Far better than the majority of recent writers Professor Aliotta recognizes and emphasizes the accurate analysis of the elements of cognition and of their reciprocal relation. He

will have naught of pan-logism or of abstract dialectic, although it might be said that his inclinations are rather toward the rationalistic than the empirical tradition. He will have naught of empirico-criticism or of pure empiricism or intuitionism, when these are taken in their absolute forms. Thought and intuition, perception and conception he finds alike integral to the cognitive process, so that one-sided systems which emphasize either phase to the neglect of its fellow inevitably lead to reactions of the most extreme type. This is the teaching of history since the time of Socrates, Plato, and the Sophists. And critical analysis shows the historical rhythm grounded in the nature of the case.

Armed with such principles, Professor Aliotta is in a position of advantage when he examines recent epistemological theories. Empirico- or agnostic evolutionism, neo-Idealism, pragmatism, intuitionism betray their several elements of weakness if they are tried by these critical tests. In particular, he is able to expose the fallacies of the ultra-phenomenalistic views of science. Here too a reaction against intellectualism has gone on. From dogmatic naturalism later methodologists have turned toward the economic and symbolic interpretation of scientific laws, toward science as concrete sensorial prevision, toward "science without hypotheses," toward phenomenalistic energetics, and the like. But this is clearly reaction. And in all these theories, when they are taken literally, it is easy to show the fault. Science never is divorced from thought, for it never can be; perception, even of the simplest kind, includes intellectual factors. The phenomenalistic methodology but repeats the errors of classical empiricism: the elements of intellection necessary to scientific knowledge are tacitly assumed; or the results of intellection are mistaken for pure percepts and substituted in their room; or, if the genesis of thought is considered, its forms are elicited from the data because they have first been introduced among them, etc. In the main the argument here is just and salutary. And it is certainly pertinent to the discussions of the day.

The final chapter broadens noëtics into metaphysics. As all knowing involves intellection, so it presupposes rational relations to a rational environment. But knowledge is a function of personal subjects alone. Nature, then, is rational and real; but mind is its end and goal. So realism of the spiritual, or as it was formerly termed, of the ideal type is the metaphysical view to which epistemology leads. Further, epistemology implies an Absolute Consciousness to which mind and nature and the relation of the two are present, for "faith in the value of science is faith in God" (pp. 460–5). This consciousness is an Absolute Self-Conscious Personality, eternally active and creative, who may be validly conceived after the analogy of man's nature, since anthropomorphism of a reasonable kind is present in all our thought. These conclusions, as we have said, are stated in the final chapter of the treatise. Much about them is attractive. But they are sketched rather than elaborated in the present work. The burden and the success of this is in epistemology proper. In

this field it is a substantial addition alike to the later historical discussions of the subject and to the more recent critical arguments.

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What Should I Believe? An Inquiry into the Nature, Grounds and Value of the Faiths of Science, Society, Morals and Religion. GEORGE TRUMBULL LADD. Longmans, Green, and Company. 1915. Pp. xiii + 275.

This book, the third in a series of four, following naturally after "What Can I Know?" and "What Ought I to Do?" is an attempt to show the reasonableness of moral and religious belief and the duty of believing. The main difference between knowledge and belief is that in the former there is always some awareness of the grounds on which our assent rests, whereas in belief proper we give our assent without being conscious of the grounds. This, however, does not mean that belief is necessarily unreasonable. "Instinctive belief is not opposed to rational conviction." On the contrary, the task of the intellect "is to discover and expand the *justification* of belief, and thus convert otherwise blind belief into rational conviction" (pp. 13 ff.).

From this it will be seen that Professor Ladd is opposed to "the present tendency to . . . discredit the authority of reason in respect to the greater faiths. . . . The office of reflective thinking . . . must always . . . be that of revealing the truth or the falsity" of our beliefs. Since, however, the highest of our beliefs "are not the offspring of sense, . . . our primary aim can not reasonably be to prove them as the demonstrative or strictly inductive sciences need proof, but to 'purify and support' them" (pp. 28 ff.).

The chapter on "The So-Called 'Will to Believe'" brings out the fact that in the title of the book, *Should* is meant to imply moral obligation. It is my duty to believe what is reasonable. "The choice of the worthier, because more reasonable, among our beliefs" is a "moral kind of activity" (p. 51). In this limited sense, Professor Ladd gives his adherence to the doctrine of "the will to believe." I am not sure, however, that his position is unassailable. That, at least in many instances, it is our duty to consider the question of the reasonableness of our beliefs will doubtless be admitted. But when, as a result of our examination, we are prepared to pronounce one belief more reasonable than another, is it then within our choice to accept the one or the other? If I am convinced that *A* is more reasonable than *B*, I already accept *A*. If I do not feel quite convinced, but still *incline to think A* the more reasonable, again there seems to be no occasion for an act of will. What we have now is a case of probable judgment, of "trowing," as Professor Ladd elsewhere calls it. In short, I think that the influence of will upon belief is more indirect and more subtle than Professor Ladd represents it as being.

Another case that the author seems to regard as furnishing an opportunity for "the will to believe" is of even more doubtful character. In

the conduct of every-day life, he says, we are often called upon to choose between two opposed beliefs. "Shall this signature be believed to be genuine, or a forgery? Which of two diseases shall the physician believe to be indicated by the symptoms of the patient? . . . A choice must be made between two beliefs, and the evidence for either is far from being clear" (pp. 62 ff.). But is this true? There is indeed occasion here for choice, but it is choice between two courses of action, not between two beliefs. I need not decide whether the signature is genuine; I need decide only whether I shall honor the check. And if a physician is uncertain which of two diseases a patient has, what he must decide is which of two courses of treatment he shall follow. In cases like these, we are not called upon to choose what we shall believe, but only which of two equally doubtful propositions we shall select as a working hypothesis.

In both his arguments, then, it seems to me that Professor Ladd fails to support his contention: he has not shown that, as a matter of fact, we do sometimes will to believe; nor that, as a matter of morals, we ought sometimes to will to believe.

Following the discussion of "the will to believe" comes a chapter on "Lesser and Greater Beliefs." Those "beliefs and faiths are to be deemed the greater . . . which belong most essentially to the *Substance of the Self;* which have actually most weight and most value for promoting the permanent interests and contributing to the choicest developments of the personal life" (pp. 75 ff.). Among these greater beliefs we have, first of all, "the belief of the Self in Itself." Besides this, there are "the belief of the mind in its own capacity for knowledge" and various other fundamental intellectual beliefs which the author does not enumerate. Then there are the basic moral beliefs and the great beliefs of religion, the most important of which is "the faith in a Living God."

The author has said that in order to impose obligation upon a rational being a belief must be reasonable. In the chapter on "Rights and Obligations of Belief," he discusses the criterion of reasonableness. The three supreme tests are the amount of evidence for the belief, in fact and in sound inference from fact; the satisfaction that it gives to our highest aspirations; and the service that it renders to the needs of practical life. In connection with the first of these, he points out that the existence of the belief is itself an important piece of evidence, whose significance is often overlooked. By this he does not mean that the existence of the belief proves its validity, but simply that if a person is trying to discredit one of the fundamental beliefs of mankind, it is incumbent upon him to show how, upon his theory, the belief could have arisen.

The remaining chapters of the book—"Comforts and Rewards of Belief," "Beliefs, Scientific and Social," "The Faiths of Morality," and "The Faiths of Religion"—while they make no very important addition to the argument, carry out, in more detail, the general lines of thought that have been already indicated.

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The Negro Races: A Sociological Study. Volume II. JEROME DOWD. New York: The Neale Publishing Company. 1914. Pp. 310.

One's adherence to the traditional belief as to the soul of goodness in things evil must be rudely shaken by a perusal of Dowd's sociological study of the African negro. From all conceivable points of view the book merits unreserved condemnation. It is not based on a thorough or even fair familiarity with the sources, first hand or secondary; the selection and arrangement of the material is arbitrary and misleading; without being in any sense a theoretical discussion, the work can not serve as a handbook, for descriptive data are in it inextricably intertwined with loosely fitting interpretations: geographical interpretations from Miss Semple, climatic interpretations from Huntington, that environmental magician, sociological interpretations from Sumner and Ellwood, psychological interpretations from McDougall. Most of the time the unwary reader could not tell where fact ends and fancy begins.

A minute analysis of the book seems unnecessary and would be tedious, but a glimpse of its uncritical character may be gleaned from a few quotations.

With reference to the Nubians we read that "the severe struggle against nature for existence develops a degree of courage and intelligence that renders the mind inhospitable to the grosser forms of superstition" (p. 28). Of their music we hear nothing, but "judging from the general desolation of the environment and the isolation of the group, the music should be of a melancholy strain" (p. 29). As to the Bahima, "the fact that nature is not here over-antagonistic and terrifying, and that the people have to cope with her and lead a somewhat strenuous life, has a tendency to develop reason and to curb the imagination" (p. 61). While the author seems to realize that in the present state of our knowledge all inference as to intelligence from brain weight and cranial capacity is hazardous, such inferences are nevertheless drawn, not merely once, as a general statement, but with reference to each group examined. Not satisfied with inferring from cranium to intelligence, the author, driven to extremes by the scarcity of craniological data among the Gallas, Somali, etc., adopts the opposite method of interpretation. We read: "the relation of brain weight to intelligence has not yet been scientifically established, but, if there is such a relation, the brain capacity of the Negro of this zone ought to be relatively high, corresponding to his superior intelligence" (p. 69). And, as if to discourage any possible criticism, the author remarks that "there seems to be a correspondence in all the African zones between the size and form of the brain and its activity." Edifying suggestions accompany the statements about Monbattu music, whose "chief musical instruments are the drum and trumpet. These instruments seem to predominate everywhere among people, who are violently excited by the fear instinct. . . . Stringed instruments, on the other hand, seem to be associated with people who are rather mildly agitated by fear, and live in a continuous mood of expansion and complaisance" (p. 113). With reference to the same Monbattu we are told that

"they are actuated strongly by the instinct of flight," and they also "have a strong instinct of curiosity, if we may judge from their fondness for hunting" (p. 120).

While the lay reader must be seriously warned against Dowd's highly incompetent work, the reading of it serves to arouse the anthropologist's instinct of humor, an instinct peculiarly indigenous to modern culture, for the reason, no doubt, that civilized man, far removed from the somber and horrifying aspects of virgin nature, finds himself surrounded by the congenial atmosphere of funny situations, funny people, and funny books.

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JOURNALS AND NEW BOOKS

RIVISTA DI FILOSOFIA NEO-SCOLASTICA. April, 1916. *La Filosofia cristiana e la guerra* (pp. 105–130): GIOVANNI PEPE.–War, although primarily an evil, has salutary effects. It arises in the conscience of nations as a means of defending their rights and of restraining the violence of tyrants and oppressors. *Politica interna e politica estera di S. Tommaso d'Aquino* (pp. 131–139): AMATO MASNOVO.–St. Thomas assimilated the theories of other philosophers, especially of Aristotle, but these theories were by his action fecundated and simplified. *Immanenza o Trascendenza?* (pp. 140–158): LUIGI BORRIELLO.–Pantheism does not answer any of the great problems of philosophy. Consciousness is not eternal and it is not immanent, but transcendent. It is beyond consciousness that we must look for the ultimate cause of all that exists. *L'idealismo di Josiah Royce* (pp. 159–172): FRANCESCO OLGIATI.–The aim of Royce's philosophy is a transformation of absolute idealism, so that it can account for the world of facts and agree with the results of modern science. *La logica vivente di una conversione* (pp. 173–184): MARIO BRUSADELLI.–A history of the conversion of Cardinal Newman to catholicism. *Note e discussioni. Analisi d'opere.* Henri Bergson, *Il significato della guerra:* C. M. Francesco de Sarlo, *Filosofi del tempo nostro: ombre e figure:* U. A. PADOVANI. G. Cimbali, *Un'intesa scientifica internazionale per la dichiarazione dei diritti dei popoli:* E. FRANGI. *Notiziario.*

Macintosh, Douglas Clyde. The Problem of Knowledge. New York: The Macmillan Company. 1915. Pp. xviii + 503. $2.50.

Sommer, G. Geistige Veranlagung und Vererbung. Aus Natur und Geisteswelt, Band 512. Leipzig und Berlin: Verlag von B. G. Teubner. 1916. Pp. 118. 1.25 M.

Trotter, W. Instincts of the Herd in Peace and War. New York: The Macmillan Company. 1916. Pp. 213. $1.85.

Unold, J. Ausgaben und Ziele des Menschenlebens. Aus Natur und Geisteswelt, Band 12. Leipzig und Berlin: Verlag von B. G. Teubner. 1915. Pp. vii + 131. 1.25 M.

Whittaker, T. The Theory of Abstract Ethics. Cambridge: University Press. New York: G. P. Putnam's Sons. 1916. Pp. viii + 126. $1.35.

NOTES AND NEWS

THE Aristotelian Society held the final meeting of the session on July 3, with Dr. Wildon Carr, president, in the chair. Professor J. Brough read a paper on "A Controversy on Import." The controversy in question was the symposium on the Import of Propositions in the Society's last session. The problem of Import is presented in a formula of Avicenna, "A proposition is the disclosure of a relation between two things, with truth or falsity." The "relation," "things," and "truth or falsity" had seemed to those who took part in the symposium the essential points of interest, but to the writer of the paper "disclosure" seemed the wonderful thing. How is it *a priori* possible that anyone should disclose anything? Logic in his view was a branch not of knowledge, but of culture. The unfairest demand that can be made on logic is that it should be "logical" in the popular sense in which sciences and other argumentative achievements are logical, that is to say, are demonstrable or evidentiary. What is a fair demand is that it shall bring into consciousness the relation of any known fact to the aspirations of the knower, and shall be fit for that educative function. Logic should be described as the Liturgy of thought, rather than as a science or an art of thinking.

ON the initiative of the Royal Society a Board of Scientific Societies has been established in Great Britain to promote the cooperation of those interested in pure or applied science; to supply a means by which the scientific opinion of the country may, on matters relating to science, industry and education find effective expression; to take such action as may be necessary to promote the application of science to industries and to the service of the nation; and to discuss scientific questions in which international cooperation seems advisable. The board at present consists of representatives of twenty-seven scientific and technical societies.

THE department of psychology of the Johns Hopkins University will be divided temporarily. One part, under the direction of Professor J. B. Watson, will be housed in the Phipps Psychiatric Clinic, the other part will be removed to the new academic building at Homewood, and will be under the direction of Professor Knight Dunlap. In the planning and in building the Phipps Psychiatric Clinic provision was made for a psychological laboratory, but the laboratory was not established.

The issue of the Journal of Philosophy which should have been numbered Volume XIII, Number 18, and dated August 31, 1916, was, through an error, numbered and dated on the cover page the same as the preceding issue, namely, Volume XIII, Number 17, August 17, 1916. The first page, however, bears the proper number and date.